



Hurricane Juliette and Coastally Trapped Waves along the Mexican West Coast

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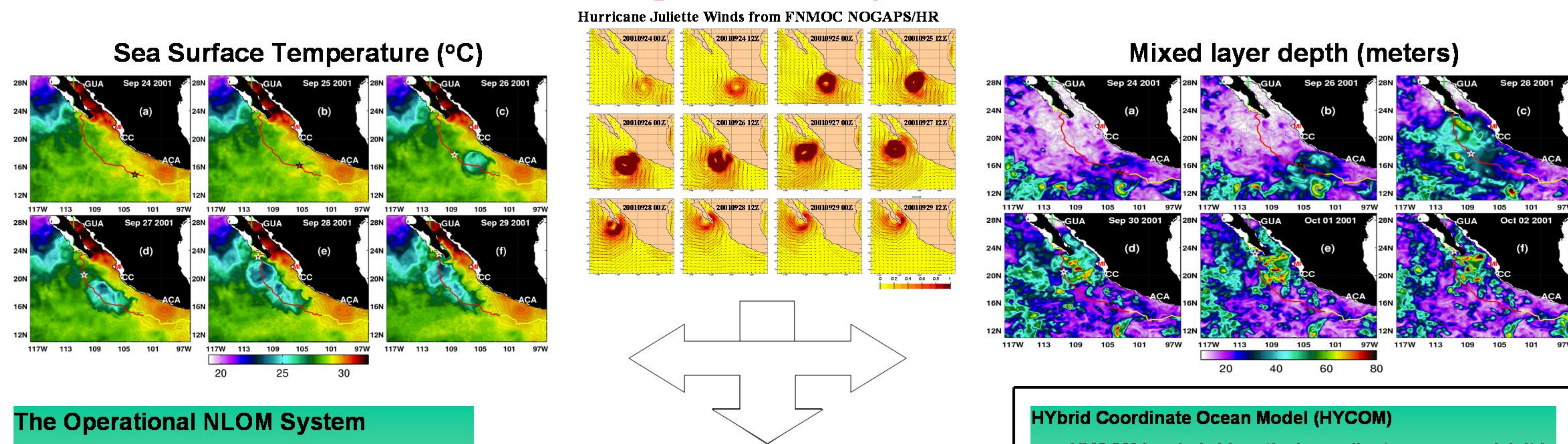
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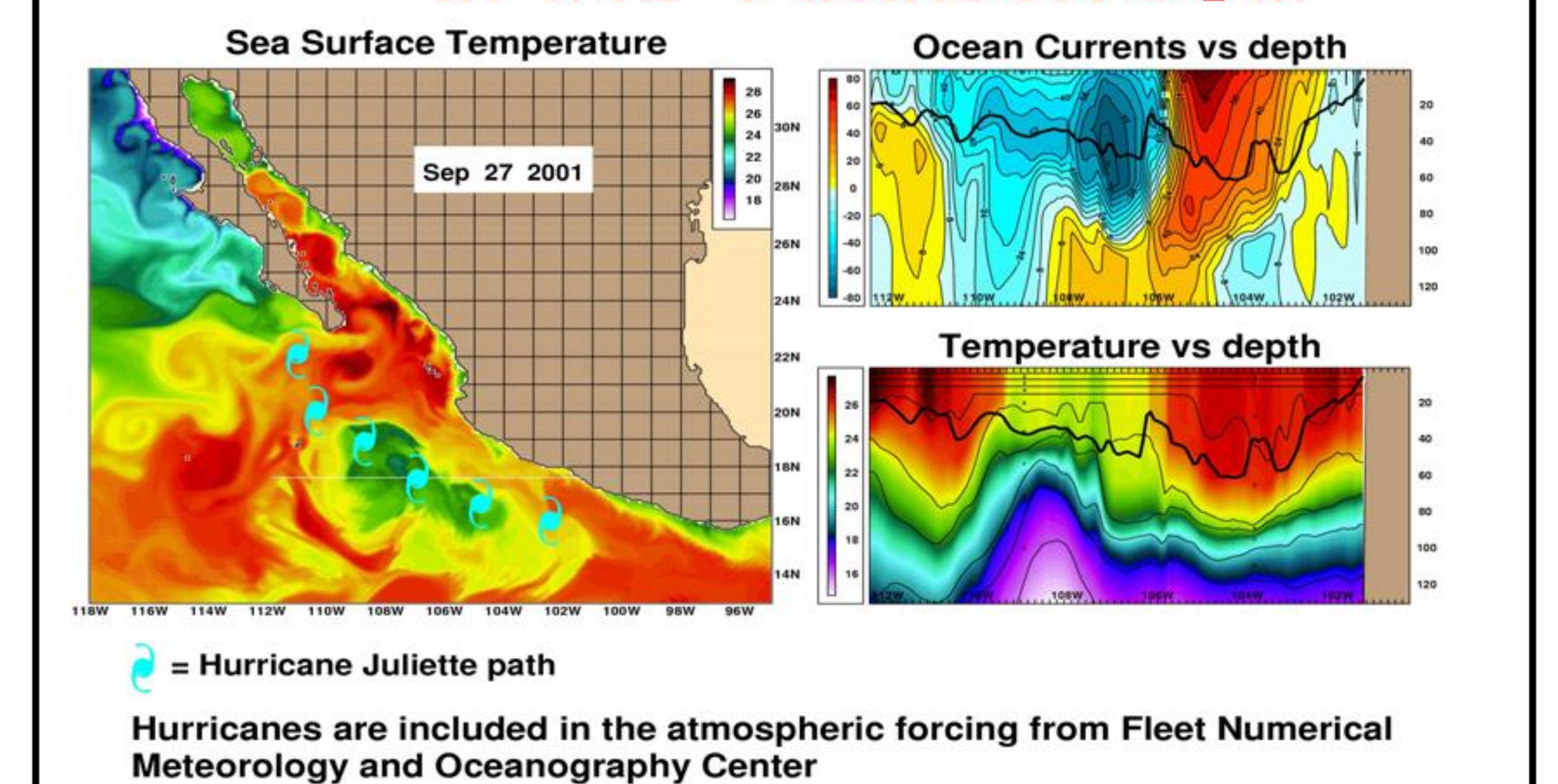


An operational real-time eddy-resolving ($1/16^\circ$) near-global version of the Navy Layered Ocean Model (NLOM) and a $1/12^\circ$ Pacific version of the HYbrid Coordinate Ocean Model (HYCOM) are used to study the evolution of two coastally trapped waves generated by Hurricane Juliette along the Mexican West Coast. Results indicate that the first wave was generated along mainland Mexico and it propagated poleward as a free coastally trapped wave; it also generated anticyclonic eddies near Cabo Corrientes and the María Islands. Upon entering the Gulf of California the wave weakened cyclonic eddies and after reaching the shelf break north of Guaymas, it reversed direction and propagated southward along the east coast of the Baja California Peninsula (BCP). Next, the wave generated an anticyclonic eddy at Cabo San Lucas. Finally, the wave weakened while exiting the gulf and propagated northward along the BCP West Coast. The second coastally trapped wave was generated by Juliette's poleward winds along the BCP West Coast, but was subsequently greatly weakened by Juliette's equatorward winds.

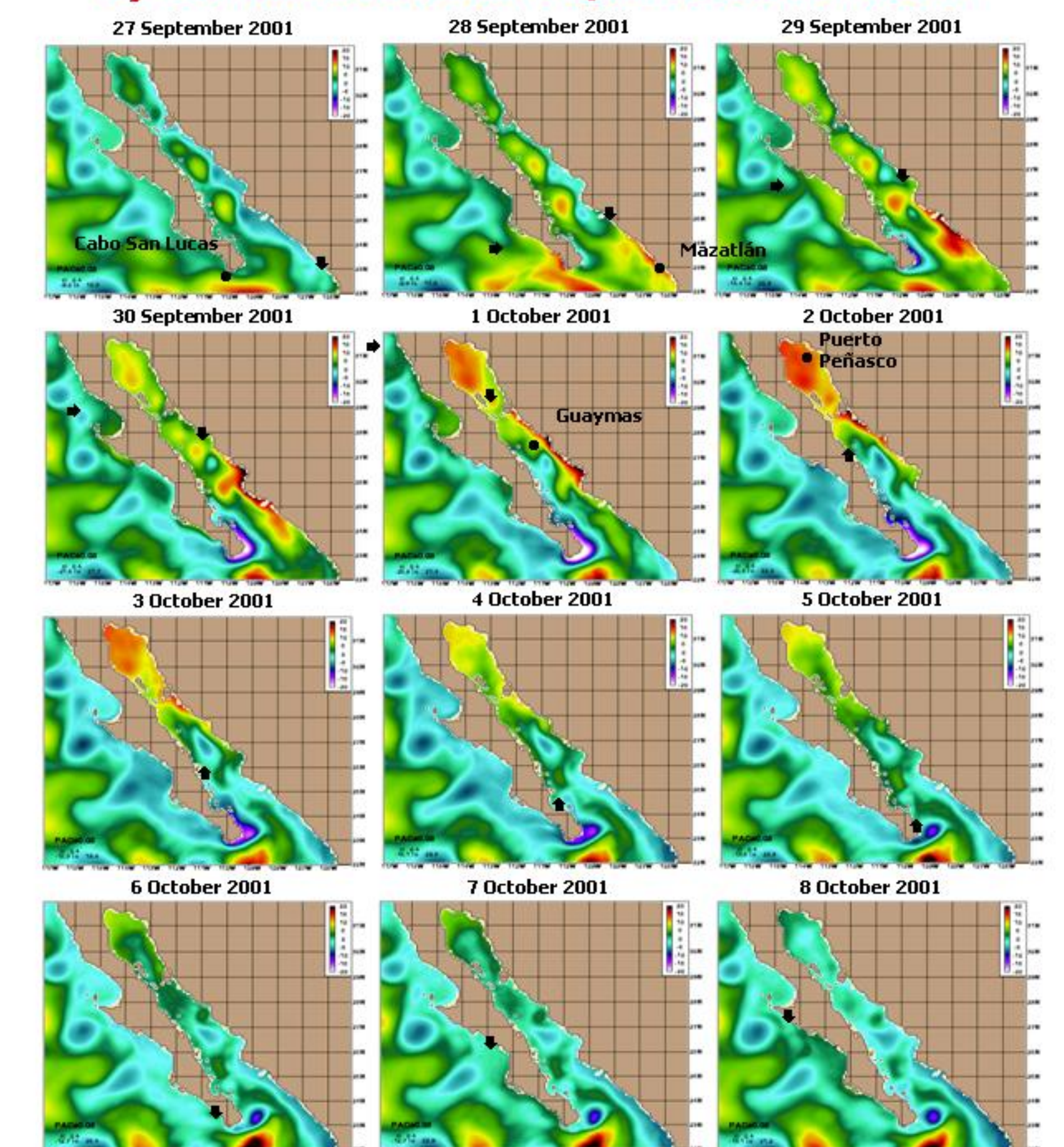
Ocean Response to Hurricane Juliette in $1/16^\circ$ near-global NLOM Operational



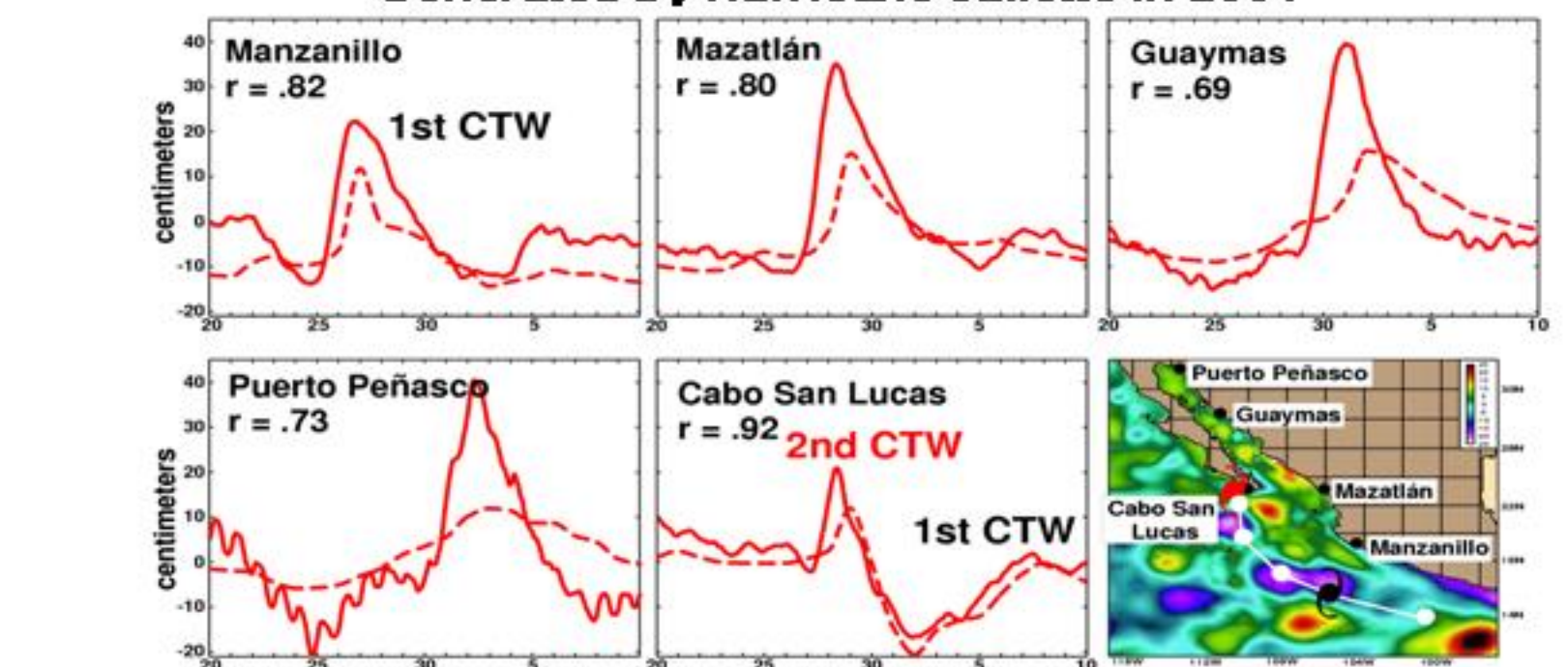
Ocean Response to Hurricane Juliette in $1/12^\circ$ Pacific HYCOM



Evolution of the Coastally Trapped Waves (CTW) Generated By Hurricane Juliette in $1/12^\circ$ Pacific HYCOM

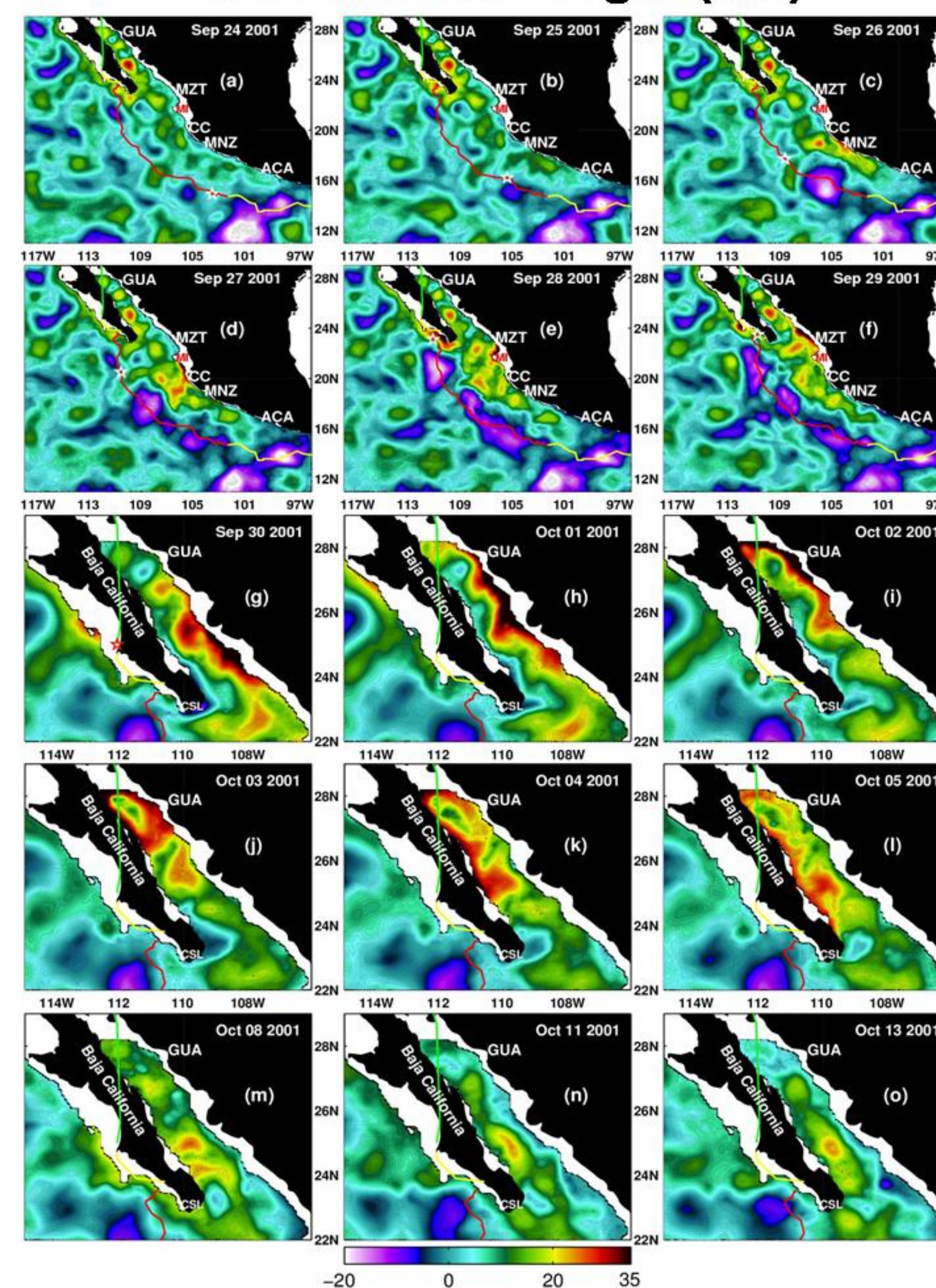


➔ Marks the leading edge of the **second CTW**
➔ Marks the leading edge of the **first CTW**
Observed (solid) vs. Modeled (dashed) Sea Level Along the Mexican Coast Associated With the Coastally Trapped Waves (CTW) Generated by Hurricane Juliette in 2001



$1/12^\circ$ Pacific HYCOM forced with FNMOC NOGAPS/HR winds and FNMOC NOGAPS thermal forcing. No data have been assimilated into this model. Sea level data provided by the University of Hawaii and the Mexican Navy.

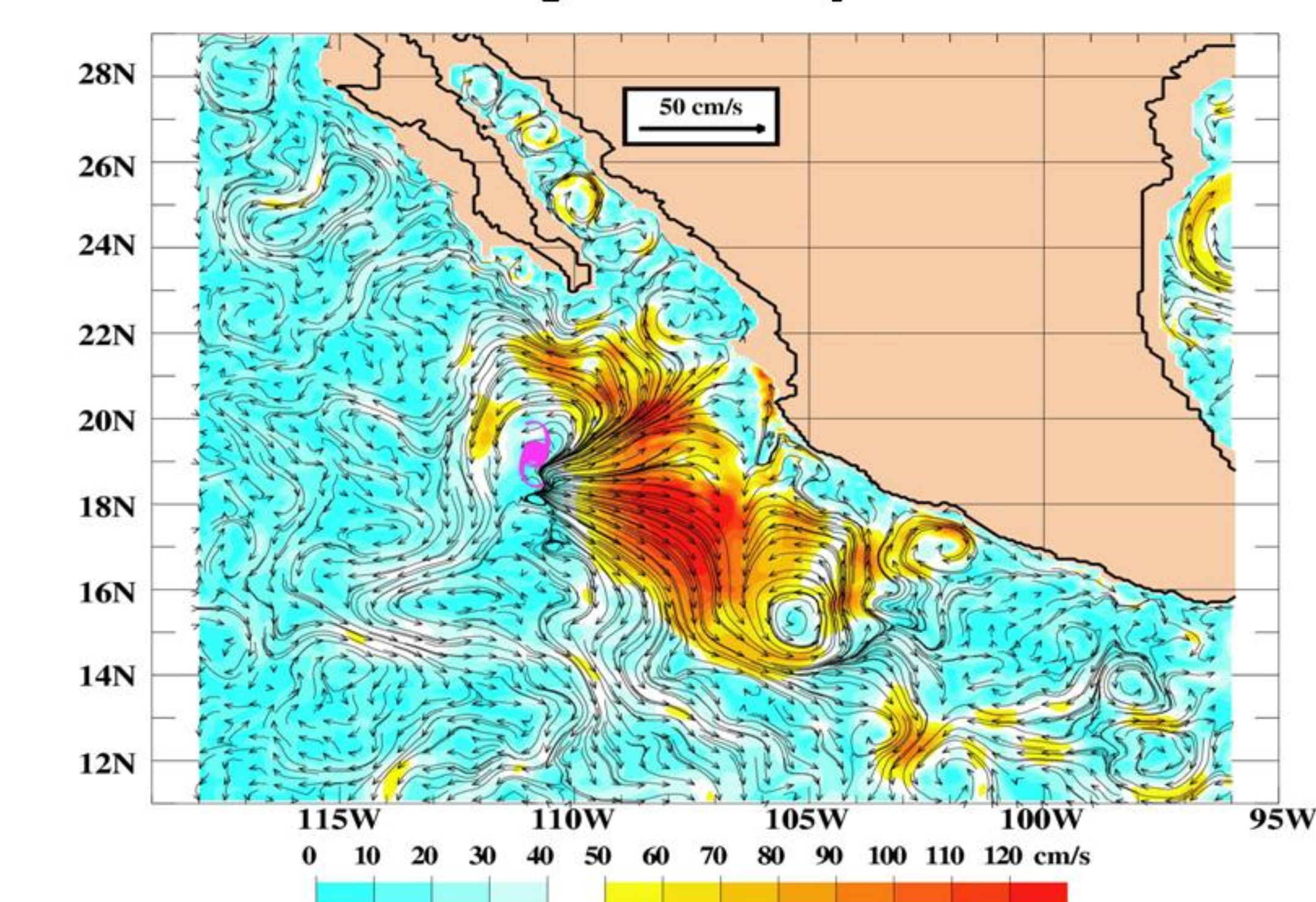
Sea Surface Height (cm)



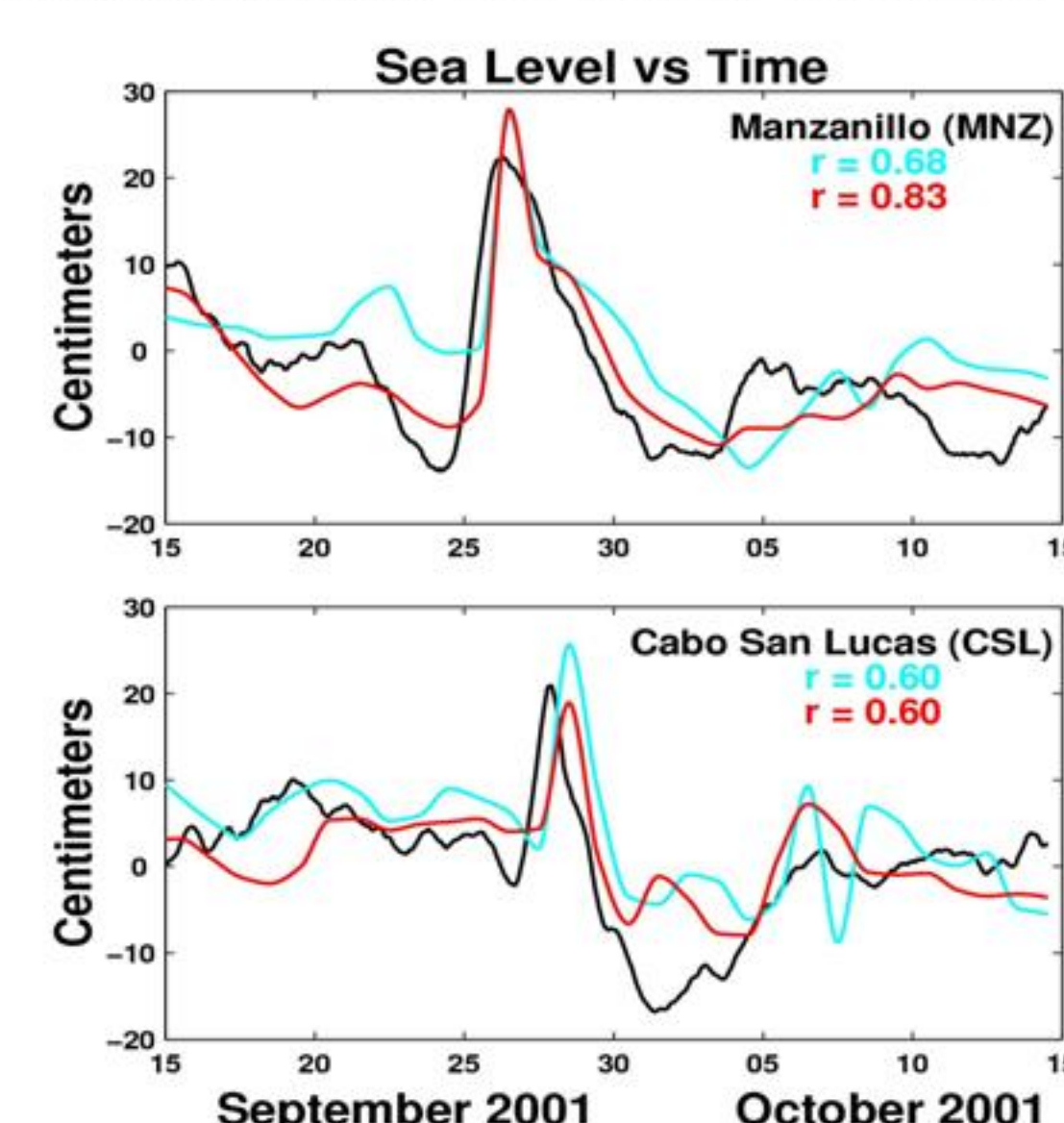
HYbrid Coordinate Ocean Model (HYCOM)

- ☺ HYCOM is a hybrid vertical coordinate ocean model. It is isopycnal in open stratified ocean, terrain-following in shallow coastal regions, and Z-level in mixed layer.
- ☺ 20 vertical coordinate layers.
- ☺ Forced with 3 hourly winds and daily average heat fluxes.
- ☺ Pacific HYCOM extends from 20°S to 62°N and from 109.125°E to 77.203°W .
- ☺ Pacific HYCOM does not include ocean data assimilation

Surface currents generated by Hurricane Juliette



Assimilation vs No Assimilation



Sea level measurements
Model sea level with assimilation
Model sea level with no assimilation